

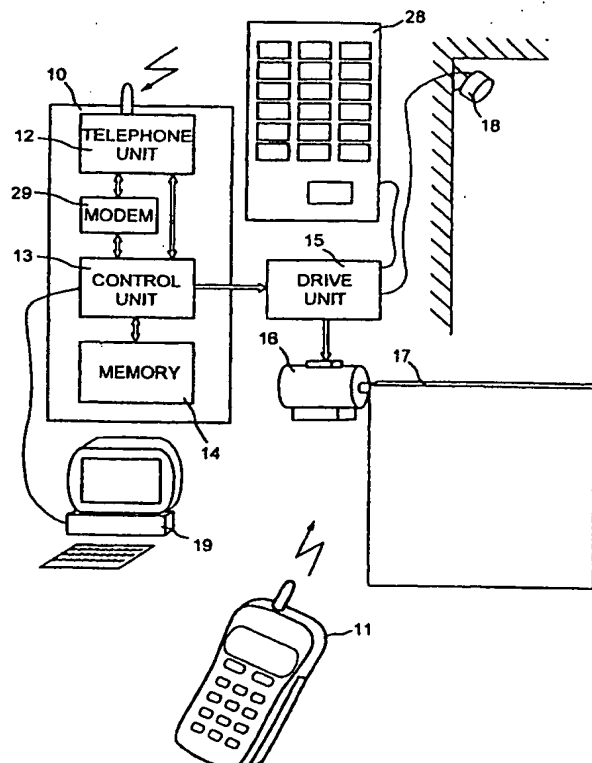
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : H04M 11/00, 3/42		A2	(11) International Publication Number: WO 00/35178
			(43) International Publication Date: 15 June 2000 (15.06.00)
(21) International Application Number: PCT/SE99/02202 (22) International Filing Date: 26 November 1999 (26.11.99) (30) Priority Data: 9804055-3 26 November 1998 (26.11.98) SE (71) Applicant (for all designated States except US): M-PHONE COMMUNICATIONS AB [SE/SE]; Box 1112, S-183 11 Täby (SE). (72) Inventors; and (75) Inventors/Applicants (for US only): JERVILL, Martin [SE/SE]; Plejervägen 9, S-230 10 Skanör (SE). JEPPSSON, Per [SE/SE]; Myntvägen 29, S-231 55 TRELLEBORG (SE). ERICSSON, Lars [SE/SE]; Sundholmögatan 20, S-216 41 Malmö (SE). (74) Agent: HANSSON THYRESSON PATENTBYRÅ AB; Patent Dept., Box 73, S-201 20 Malmö (SE).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>In English translation (filed in Swedish). Without international search report and to be republished upon receipt of that report.</i>	

(54) Title: METHOD AND DEVICE FOR ACCESS CONTROL BY USE OF MOBILE PHONE

(57) Abstract

A method and a device for access control, whereby a control unit (13) is operatively connected with a memory (14) for storage of authorized identification numbers for current service or access in a register. The control unit (13) is operatively connected with a telephone unit (12) for reception of an identification number of a calling party by means of a telephone connection made by wireless telephony from a remote control unit (11). The control unit (13) is designed to compare the received identification number with the stored identification numbers without answering the telephone connection, and to emit a signal to accept authorization if the received identification number is in agreement with an identification number stored in the register.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

METHOD AND DEVICE FOR ACCESS CONTROL
BY USE OF MOBILE PHONE

THE FIELD OF THE INVENTION

5 The invention concerns a method and device for access control. The designation 'access control' pertains, among other things, to the unlocking and opening of doors, ordering and reception of products, and control of charging for expenses to the account of an authorized person and similar.

 Examples of practical applications are automatically opening doors for
10 garage installations, activation or deactivation of alarms, purchases from vending machines and similar, and starting or stopping of heating systems and similar.

STATE OF THE ART

15 Completely different systems are used today for the applications listed above. Today garage installations can be equipped with remote control devices, by means of which the user of the garage can open the garage door from an automobile. All remote control devices are usually designed to emit a
20 simple identification signal that is the same for all users. A receiver at the garage door receives the signal emitted by the remote control device and opens the door if the identification signal is the correct one. It is a great disadvantage that a remote control device can be stolen and misused for entrance into the garage. If even one remote control device is misused in any
25 way, it can be necessary to exchange all of them so that a new identification signal can be used. It is also necessary to replace or adjust the receiver.

 Similar remote control devices are used for remote activation and corresponding deactivation of alarms. It is, however a prerequisite that the identification signal be unique for every alarm installation so that individual alarm
30 installations are not activated by others than persons who are authorized. Remote control devices must therefore be produced in many different de-

signs with unique identification signals. Even every alarm installation must be given a unique design, which becomes costly both to produce and exchange.

There are systems on the market today by means of which heating systems and similar can be remotely controlled by telephone. The simplest systems are based on a receiver connected to the telephone network that registers the number of incoming telephone connection signals. A certain number of signals corresponds to a certain command or a certain control signal. An advantage with this type of remotely-controlled systems is that there is no on-line connection, which means that no expense is incurred for the connection. Such a simple system can, however, easily be misused and activated accidentally.

More complicated but secure systems suffer in principle from the same drawbacks and disadvantages as the alarm systems described above.

15 THE INVENTION IN SUMMARY

One objective of the invention is to provide a method and device with access control, whereby an arbitrary number of users can be checked for purposes of authorization in a simple manner and so that authorized users can easily be added or removed. This objective is attained in that the invention incorporates the special features cited in patent claims 1 and 3, respectively.

In accordance with a preferred embodiment the authorized identification numbers are stored in a register that is connected with a control unit. The register and control unit are included in a central processor that is connected with the equipment to which the user will receive access if correct authorization can be established. The central processor can have a wireless connection with a remote control device by means of a telephone unit included in the central processor, preferably in form of a conventional mobile telephone.

In conjunction with checking for purposes of authorization, a telephone connection is made from the remote control device to the central processor's telephone unit. The identification number of the party dialing, actually the subscriber number, is thereby transmitted to the telephone unit in a conventional manner. The identification number is available in the telephone unit without the connection being answered. The identification number is usually used for the so-called CLIP, "Calling Line Identification Presentation", i.e. a caller-ID. A prerequisite is thus that the mobile telephone be connected with an operator and a mobile telephone system that includes this or corresponding service.

The received identification number is compared with the authorized identification numbers stored in the register. When they are in agreement, the control unit can emit a control signal to the appropriate equipment so that the subscriber is given access to it, for example in that an automatically controlled door is opened. The comparison with the stored numbers and subsequent control of the equipment or service to which the identification number grants access occurs without a telephone connection being set up. Nor does the user need to enter a code but needs only to dial the telephone number that is associated with the equipment or service.

Further advantages and special features of the invention can be seen from the following description, drawings, and dependent patent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in more detail with the aid of exemplary embodiments with reference to the enclosed drawings on which

FIG 1 schematically shows two alternative embodiments of a device according to the invention and

FIG 2 is a flow chart that shows an example of steps carried out in a manner according to the invention.

THE INVENTION

The embodiment of a device according to the invention shown schematically in FIG 1 includes a central processor 10, which can be connected with different types of equipment for control of the equipment. Central processor 10 is also connected with a remote control unit 11 by means of a wireless connection. In a preferred embodiment of the device according to the invention remote control unit 11 includes a mobile telephone. In a simple embodiment remote control unit 11 consists wholly of a conventional mobile telephone.

Central processor 10 includes a telephone unit 12 for mobile telephony and a control unit 13 operatively connected with telephone unit 12. When connection of telephone unit 12 occurs, the identification number of the connecting subscriber is transferred directly to control unit 13. The transfer of the identification number occurs without the connection being answered. Central processor 10 also includes a memory 14 with a register for identification numbers. Identification numbers can be transferred to memory 14 by means of telephone unit 12 or another unit in the manner described below. Without answering the connection control unit 13 compares the incoming identification number with identification numbers stored in the register of memory 14.

If the incoming identification number is in agreement with a stored identification number, control unit 13 determines that there is authorization. In the embodiment shown the condition that there is authorization leads to transmission of a control signal to drive unit 15 that is operatively connected with control unit 13. The control signal causes drive unit 15 to start motor 16, so that a door 17 is opened. Door 17 is preferably a garage door or similar.

A system of the type described above is more secure than a conventional lock and key system, since a person who comes into possession of remote control unit 11 and is not authorized must also know the telephone number that is required in order to communicate with the telephone unit. Cor-

respondingly higher security is also present as compared to systems based on conventional remote controls and magnetic cards.

In an alternative embodiment the control signal from control unit 13 is used to activate or deactivate an alarm in an alarm unit 18. Activation or de-
5 activation can occur directly or by means of a suitable drive unit 15. In accordance with one embodiment the alarm is activated at every second telephone connection and deactivated at every second connection. A simple embodiment of this type gives limited security, since authorization to activate alarm unit 18 is given to the person who has remote control unit 11.

10 Security can be increased in different ways or provided on different levels, for example by letting telephone unit 12 answer a telephone connection from remote control unit 11 and also requiring that a code be transferred to telephone unit 12 and accepted by control unit 13 in order to grant a higher or complete authorization. A mobile telephone and the associated
15 keypad for transfer of tone signals corresponding to the pressing of keys in a conventional way are preferably used in such an embodiment.

The identification numbers that are stored in the register of memory 14 can be transmitted to the register in different ways. According to a preferred embodiment all identification numbers are transmitted wirelessly by means of
20 telephone unit 12. In such an embodiment a special software program is activated in control unit 13 and data corresponding to identification numbers are loaded by means of a modem 29 into the register in memory 14 after a telephone connection has been established from a telephone unit with predetermined identification numbers and the connection has been
25 answered. Uploading of identification numbers into the register of memory 14 according to an alternative embodiment is accomplished by means of a computer 19 operatively connected with control unit 13. Computer 19 is suitably portable and is connected with central processor 10 in connection with storage of current identification numbers.

When a device according to the invention is to be used, a telephone connection that corresponds to an authorized identification number is made from remote control unit 11, usually by means of a normal mobile telephone. The connection is made to the telephone number that corresponds to the
5 desired service or product, for example the telephone number of the telephone unit that is associated with a garage door or similar.

FIG 1 also schematically shows a third alternative embodiment. In accordance with this embodiment, drive unit 15 is connected with a vending machine 28 or similar. By the same means, in principle, as described below
10 an owner of a mobile telephone with a registered subscriber number or identification number can have access to any product in vending machine 28 by connecting with telephone unit 12, which is associated with vending machine 28. The removed product can later be debited from the account of the owner of the registered identification number. Corresponding amounts can alternatively be charged to an associated account, for example a gasoline card or
15 credit card.

The flow chart in FIG 2 schematically shows what happens after that in central processor 10. When the telephone connection is made, the subscriber number or identification number of the party calling is detected in position 20. It is determined in position 21 whether the incoming identification number corresponds to an identification number that gives authorization to make changes in the register of authorized users or subscribers. If that is the case, the call is answered in position 22. With use of suitable program software in control unit 13 and suitable hardware, for example a modem, central
20 processor 13 receives new identification numbers in position 23 and stores them in the register in memory 14. When all changes or additions have been made, the connection is terminated in position 24. The steps taken in positions 21 to 24 can be eliminated if updating of the register in memory 14 and central processor 10 is otherwise accomplished by means of direct physical
25 connection with computer 19 or in another way.
30

A detected called-in identification number is compared in position 25 with the identification numbers stored in the register in memory 14. The comparison preferably occurs with the aid of control unit 13 and without the telephone connection being answered. If the calling identification number is found in the register, authorization is accepted in position 26. The external unit that is associated with the subscriber number of the telephone is then activated in position 27. The central processor then returns to position 20 and detects any new called-in subscriber number.

If, on the other hand, the called-in identification number is not found in the register upon comparison in position 25, the central processor returns to position 20 and detects any new called-in subscriber number.

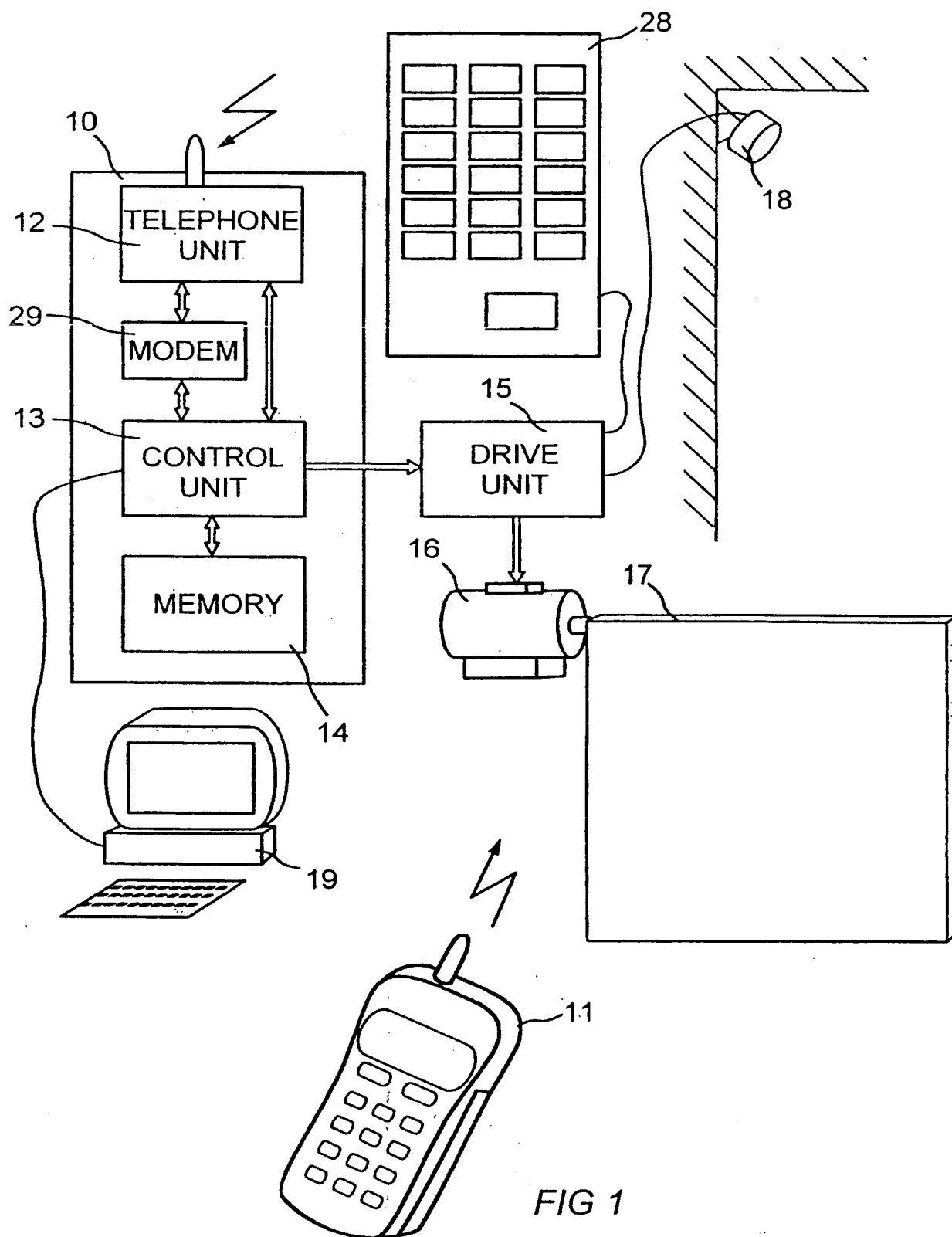
Through the fact that information on authorized persons is stored in the register of memory 14 in the manner described above, updating can be accomplished quite simply. Updating can remain current when new users are added or old ones dropped. It is also very easy to remove an identification number, if the remote control unit is lost or stolen. Such correction can occur without other users being affected in any way.

PATENT CLAIMS

1. A method of access control, *characterized* in
 - 5 that authorized identity numbers are stored in a register for current service or access,
 - that the identification number of a user is sent as an identification signal for the calling party in a telephone call by means of a wireless telephone,
 - that the identification number is compared with the identification numbers
 - 10 stored in the register without answering the telephone call, and
 - that authorization is accepted if the incoming identification number is in agreement with an identification number stored in the register.
2. A method according to Claim 1, whereby the register is updated by re-
 - 15 ceiving a predetermined identification number through a telephone connection, by answering the telephone call, and by transmitting data corresponding to identification numbers by means of telephony for storage in the register.
3. A device for access control, *characterized* in
 - 20 that a control unit (13) is operatively connected with a memory (14) for storage of authorized identification numbers for current service or access in a register,
 - that the control unit (13) is operatively connected with a telephone unit (12) for reception of an identification number of a calling party by means of
 - 25 a telephone connection made by wireless telephony from a remote control unit (11),
 - that the control unit (13) is designed to compare the received identification number with the stored identification numbers without answering the telephone connection, and
 - 30 that control unit (13) is designed to emit a signal to accept authorization if the received identification number is in agreement with an identification number stored in the register.

4. A device according to Claim 3, *characterized* in
that the remote control unit (11) comprises a mobile telephone and
that the identification number consists of the subscriber number associated
5 with the mobile telephone.
5. A device according to Claim 3, *characterized* in
that the control unit (13) is operatively connected with a drive unit (15) for
activation of the drive unit (15) by means of the signal accepting au-
10 thorization.
6. A device according to Claim 5, *characterized* in
that the drive unit (15) is operatively connected with a motor unit (16) for
opening of a door (17) when receiving the signal accepting authoriza-
15 tion.
7. A device according to Claim 5, *characterized* in
that the drive unit (15) is operatively connected with an alarm unit (18) for
activation and deactivation when receiving the signal accepting au-
20 thorization.
8. A device according to Claim 5, *characterized* in
that the drive unit (15) is operatively connected with a vending machine
(28), for supplying vended items when receiving the signal accepting
25 authorization.
9. A device according to Claim 3, *characterized* in
that a computer unit (19) is operatively connected with the control unit (13)
for transfer or updating of identification numbers in the register of
30 memory (14).
10. A device according to Claim 3, *characterized* in

- that the control unit (13) is designed to answer an incoming call if a current identification number is in agreement with a predetermined identification number, and
- that the control unit comprises a modem for transfer of identification numbers for entry into or updating of the register of memory (14).
- 5



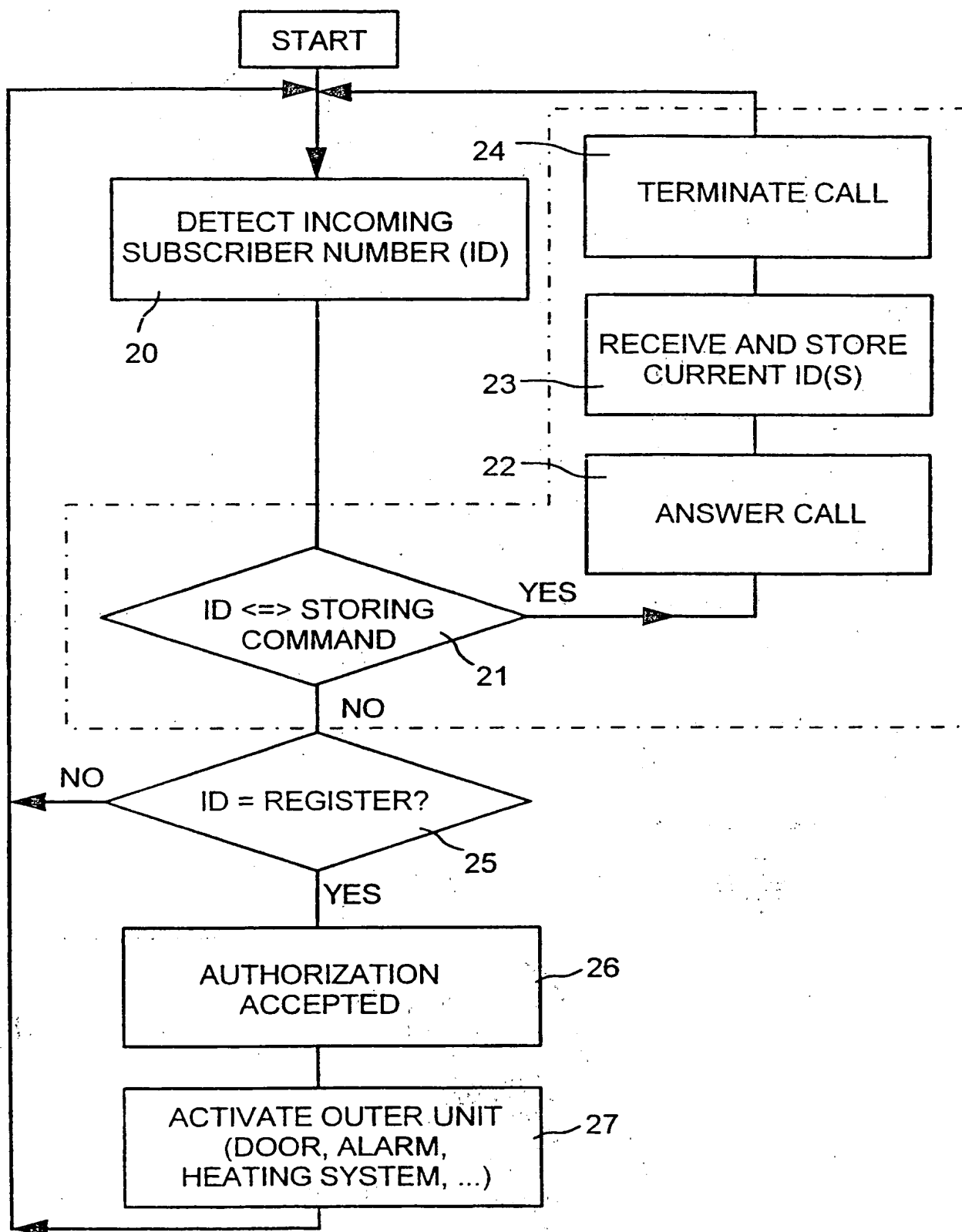


FIG 2